In the Claims

1. (Currently Amended) A method for depositing in particular crystalline active layers on in particular crystalline substrates from gaseous starting substances, which are introduced, in particular together with a carrier gas, into the process chamber of a reactor, where, depending on process parameters determined in preliminary tests, such as in particular substrate temperature, process chamber pressure, mass flow of the starting substances introduced into the process chamber and total mass flow, in particular after prior pyrolytic decomposition, they are deposited on the substrate and form an active layer, the layer properties of which, such as in particular stoichiometry, doping, morphology, temperature, growth rate or the like, are determined from surface measurements or measured without contact by means of sensors acting in the process chamber, characterized in that, in addition to the set of process parameters which contains the process parameters which lead to the desired layer properties, calibration parameters are also determined in the preliminary tests, by the deviations in the layer properties when individual process parameters are varied being determined and the corresponding deviation being placed into a relationship with the process parameter variation, and by, in the production run, prior to the deposition of the active layer, at least one calibration layer, the layer properties of which are measured or determined, being deposited in the same production run, deviation values being formed by placing these properties in a relationship to the desired layer properties, and by one or more process parameters being altered in accordance with the calibration parameters for deposition of the active layer as a function of the magnitude of the deviation values.

2. (Currently Amended) A method according to Claim 1 or in particular according thereto, characterized in that the method is an MOCVD method.

3. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the process parameters also encompasses the source temperature of the liquid MO sources.

4. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the mass flows are measured and controlled using mass flow controllers.

5. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the starting substances also comprise one or more dopants, and the dopant concentration is also determined as a layer property.

6. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the stress in the layer is also determined as a layer property.

7. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the sensor is a reflection anisotropy spectroscope (RAS) or an ellipsometer.

8. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the sensor for the temperature measurement is a thermocouple or an optical sensor, for example a pyrometer.

9. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the in situ measurement is carried out using X-ray diffraction, electron diffraction (REED) or IR reflectometry.

10. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the calibration layers comprise a multilayer structure.

11. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the layers in the calibration layer sequence have different energy gaps.

12. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the calibration layers have different growth rates.

13. (Currently Amended) A method according to claim 1 ~~one or more of the preceding claims or in particular according thereto~~, characterized in that the production run, in the event of the desired layer properties not being maintained, is interrupted and/or deposits a covering layer on the layer.

14. (Currently Amended) A device for depositing crystalline active layers on crystalline substrates from gaseous starting substances comprising: ~~carrying out the method according to one or more of the preceding claims, having~~ a process chamber ~~(2)~~, which is arranged in a reaction housing and can be heated in particular by heat being supplied to a substrate holder ~~(6, 7)~~, having a gas inlet ~~(3)~~ for the admission of gaseous starting substances, the decomposition products of which are deposited on a substrate supported by the substrate holder to form a layer, having at least one sensor which acts into the process chamber in order to determine the layer properties, and having an electronic control unit for controlling the process chamber heating, mass flow controllers for controlling the mass flow of the starting substances and a pump for controlling the process chamber pressure, characterized in that the electronic control uses stored calibration parameters to form altered process parameters from deviation values obtained during growth of the calibration layer, and thereby controls the process

chamber heating, the mass flow controllers and the pump during the growth of the active layer sequence.

15. (Currently Amended) A layer sequence of a semiconductor layer which has been deposited on a substrate ~~using the method of one or more of the preceding claims~~, characterized by one or more calibration layers which, after a buffer layer, are followed by the active layer.